Productivity of irrigated pastures in northern Victoria

C.R. Stockdale and F.M. Martin

Department of Agriculture, Animal and Irrigated Pastures Research Institute, Kyabram, Vic. 3620

Irrigated pastures are the most important irrigated crop in Victoria, occupying 80% of the total area that is laid out for irrigation. Just over half the pasture is irrigated in summer and consists of the perennial species, paspalum *(Paspalum dilatatum),* perennial ryegrass *(Lolium perenne)* and white clover *(Trifolium repens).* The balance is irrigated in autumn and spring only and is based on the annual species, subterranean clover *(Trifolium subterranean)* and Wimmera ryegrass *(Lolium rigidum).* These pastures support livestock industries, particularly dairying, which have a large economic impact on the state. Despite the importance of irrigated pastures to agriculture, few estimates of pasture productivity exist. This paper describes the seasonal growth pattern for both irrigated perennial pasture (PP) and irrigated annual pasture (AP) in northern Victoria.

Methods

The growth rates of the pastures were measured each month for the period 1976 to 1980. The pastures were located on dominant soil types of the region and recommended levels of superphosphate were applied. The pastures were generally within paddocks (two for each type) that were rotationally grazed by dairy cows, although some annual pastures were set-stocked with sheep in autumn-winter and closed for hay in spring. At the beginning of a month, two sites with similar quantities of herbage of similar composition were visually selected within 5 m of each other. A rectangular, galvanised weld-mesh cage (1.35 m x 1.60 m) was placed over one site. The pasture within a square quadrat (0.04 m^2) at the other site was cut to ground level. At the end of the month, the pasture at the caged site was cut. The difference between the two represented the monthly growth. Samples were dried at 60?C for 72 hours before weighing. Eighteen and 16 quadrats were cut each month from PP and AP respectively.

Results and Discussion

Mean monthly growth rates for both pastures, together with the associated standard deviations, are given in table 1. Mean yearly production was 18.3 t DM/ha for PP and 11.0 t DM/ha for AP, which represents 1.1 and 1.0% conversion of photosynthetically-active radiation respectively.

Table 1. Measures of the productivity of irrigated pastures (kg DM/ha/day)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PP growth rate	89	74	47	40	1	7	10	24	54	88	81	102
±SD	*6.6*	*9.0*	*7.1*	*11.1*	*9.1*	*4.3*	*9.7*	*9.9*	*16.8*	*27.2*	*10.9*	*11.6*
AP growth rate	0	−3	11	41	32	32	35	48	63	77	−8	14
±SD	*8.2*	*6.8*	*17.6*	*11.0*	*5.3*	*10.0*	*8.3*	*5.0*	*14.0*	*16.5*	*38.5*	*9.8*

Examination of the variability about each monthly mean indicates that spring was the most variable period for pasture growth. It appeared that this was at least partially due to the large effect of climatic factors during this period, particularly temperature and amount of sunshine (radiation). It is also important to note the comparative levels of growth of AP and PP during winter; some AP on dairy farms allows considerable flexibility in management.

For many of the small farming units existing in northern Victoria, research must increase the quantity of pasture that can be grown for them to survive as an entity. Experimental plots have shown that 4% conversion of radiation is achievable (1); this must be the aim of future research.

1. Cooper, J.P. 1970. Herbage Abstracts 40: 1-15.